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Forest Insect Laboratory
445 U. S. Court House
Portland, Oregon
October 25, 1941

To: Regional Forester, Forest Service Building, Ogden, Utah

Attention: C. J. Olsen and W. L. Robb

From: R. L. Furniss, Associate Entomologist

Subject: Mountain Pine Beetle Infestation on the Wasatch National Forest (S CONTROL - Wasatch Insect)

Thank you for your letter of October 14 transmitting the summary of the 1941 survey estimates of the mountain pine beetle infestation on the Wasatch National Forest. These estimates have been reworked somewhat and compared with the 1940 estimates (see enclosed memorandum). The points upon which you asked for comments are also discussed in the memorandum.

R. L. Furniss

Enclosure

Copy sent Wasatch

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

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Forest Insect Laboratory
445 U. S. Court House
Portland, Oregon
October 24, 1941

MEMORANDUM ON THE 1941-42 PINE BEETLE CONTROL PROJECT ON THE WASATCH NATIONAL FOREST - FALL OF 1941

By
R. L. Furniss

During the period September 14 to October 2 ten days were spent on the mountain pine beetle control project on the Wasatch National Forest. Assistance was given the Forest Service in organizing the technical details of this project. The spotters and straw bosses were assembled and given a two-day course of instruction. Following this, the work of the spotters and survey crews was rechecked and suggestions made wherever necessary to assure uniform practice. The early treating work was checked and discussed with the men in charge. On October 1 various phases of the project were gone over in the field with the following members of the Forest Service: L. S. Cross of the Washington Office, W. L. Robb of the Regional Office, and J. T. Mathews and B. V. Groves of the Wasatch. In addition the spring oil treating in the Mirror Lake unit was examined and a final check was made of the Triton and fall-ortho experiments. General conditions in the Provo-Duchesne and Fish Creek-Rock Creek areas were observed, but the control units on the north side were not visited.

The spotters' school was conducted on September 16 and 17 at camp 1 along the Soapstone utilization road. Twenty spotters and straw bosses were in attendance. Mr. Clark Miles of the Regional Office gave instructions to the survey crew leaders on the method of laying out baselines by latitudes and departures. Mr. Merrill Miller, first aid specialist, discussed methods of accident prevention. The writer was assisted by Bruce Groves, Ben Swapp, and Grant Foote in outlining principles of spotting and control. After a preliminary instruction period, the men were divided into crews and sample strips were run through a heavily infested area on the Iron Mine unit. Problems were discussed as they came up. Special instructions that developed as a result of the school were mimeographed and distributed to the spotters to supplement the more general instructions prepared by D. A. Hester, originally for use in Region 2. A copy of the supplemental instructions is included with this memorandum.

An important feature that was brought out during the spotters' school was the presence of hold-over brood in many of the trees attacked in 1940. A positive check on this occurrence was possible, for the area where the sample strips were run had been spotted and the infested trees marked last spring. These marked trees were not treated. This fall when they were re-examined a considerable number were found to be still heavily infested. Brood in the larval, pupal, and callow adult stages was observed. Sample trees were felled and examination of these revealed that the hold-over brood extended well into the tops. The lateness of the season indicated that there would be little additional emergence this fall. Consequently, it was decided that the hold-over trees containing a considerable amount of brood should be treated along with the 1941 trees. Rules for marking the hold-overs were developed. All such trees were sampled at head height. It was found that those trees having definitely greenish foliage and moist inner bark at the point of sampling were very largely the ones containing sufficient brood to justify treating.

On September 18 the Mirror Lake control unit was visited in company with Mr. Arnold Hanson of the Regional Office. A representative number of trees treated with ortho and oil at various times during July were examined. Brood mortality in these trees was found to be very nearly 100 percent. Only in a few cases, where the bark around large knots had not been fully covered, was any survival noted. The fall examination, together with the one made last July, indicates that the oil treating in the Mirror Lake unit was very effective in killing brood in the treated trees. This year's survey further substantiates the effectiveness of this control project.

The fall survey was still in progress when the writer left the Wasatch on October 2. Since then the survey has been completed and a summary of the findings has been furnished through the Regional Office. In his letter of transmittal the regional forester has outlined the opinion of the Forest Service regarding the effectiveness of last year's control work and has also set up priorities for this year's work. The pertinent points in this letter are quoted as follows:

"We feel that the work on the north side of the Uintas comprising the West Fork, Smiths Fork and East Fork units has been successful. The work done on the south side on the Broadhead-Haystack unit has not. The Mirror Lake we believe has been.

"We do not know that you would agree but we feel that the situation on the Broadhead-Haystack unit is to be expected in view of the fact that it lies immediately adjacent to the bad infestation on the Iron Mine unit.

"We feel that our general plan of action should be: (1) To hold what we have and then (2) clean up additional units. Under such plan then our highest priority work would be to clean up the north side units on the Wasatch. Next on the list should be to clean up the north side of the Ashley and third would be to clean up and hold the worked-over south side units. Finally, we should attack new units on the south side.

"We plan then on a small clean-up job off the forest on the East Fork of Blacks Fork listed as the Wyoming unit and estimated at 640 trees plus a job of about that size east of the Hewinta station. We also plan to clean up the Ashley for which estimates have not yet been received but which will probably be of 2,000 to 3,000 trees.

"We will rework the Broadhead-Haystack unit and further reduce the Mirror Lake infestation and finally we hope to clean up the Iron Mine infestation.

"Further than this funds will probably not be available."

The writer is in nearly complete agreement with the opinions expressed above. The matter of priorities is already well established and has been discussed in detail, both in the field and in correspondence dealing with the Wasatch project. It would seem advisable, however, to make absolutely certain that the Ashley center is cleaned up even though it might mean that some of the other north side units may not be covered. These units on the Wasatch were treated largely to prevent spread to the Ashley. Now the situation on the Ashley seems acute. If the outbreak on the Henry's Fork is allowed to develop awaiting the final mopping up on the Wasatch, a serious infestation may easily develop.

As for the heavy infestation in the Rock Creek-Fish Creek areas, this can well be left until the last for the stands in this area have already been depleted to the point where the beneficial effects of control will be largely confined to the prevention of spread to other areas. In the case of the Iron Mine unit spread of infestation seems to have already reduced the effectiveness of control in the adjoining Broadhead-Haystack unit. Actually the Mirror Lake, Broadhead-Haystack, and Iron Mine units comprise a continuous infestation area and control in any one or two units will not be successful without control in all three. Therefore, it is proposed that the control already undertaken in the Iron Mine unit be completed, even though this might also mean a reduction in some of the maintenance work.

For purposes of comparison a summary has been made of the 1940 and 1941 survey estimates of mountain pine beetle infestation on the Wasatch (see table 1). It is recognized that in some units either more or fewer trees than the 1940 estimate were treated, but the figures on number of trees treated and the acreage actually covered are not all available. The estimates, however, should be sufficiently accurate to give a fair measure of the effectiveness of control on treated units and also an indication of the infestation trend on untreated units. In table 1 the 1940 and 1941 estimates are compared on a per acre basis. The following points stand out.

The estimates for all three main areas show an average downward trend of infestation. Part of this apparent decrease may be the result of including more lightly infested acreage in the 1941 survey than in that of 1940. Even so, it is certain that no such increases occurred as did last year, and it is probable that there has been an actual decrease.

During 1941 there was a marked reduction averaging 90.4 percent on the north side area. Much of this reduction must be attributed to thorough treating on the West Fork, East Fork, and Smith's Fork units.

In the Provo-Duchesne area generally, the 1941 infestation is 37.8 percent less than in 1940. The Mirror Lake unit shows a 73.6 percent reduction following control, but the much larger Broadhead-Haystack unit shows only a 27.1 percent reduction. Very likely infiltration from the adjoining untreated Iron Mine unit nullified control efforts on the Broadhead-Haystack unit. It is not surprising that infestation in the Iron Mine unit should show signs of declining, for the host material there is rapidly becoming exhausted. The comparative status of the Hades Canyon center is uncertain because a 1940 estimate is lacking.

When averaged, the 1941 infestation in the various units of the Rock Creek area shows a decrease of 33.8 percent but Squaw Basin and Fish Creek show increases of 24.2 and 54.4 percent respectively. Infestation in the Rock Creek unit remains at approximately the same level as last year with only a 7.5 percent decrease.

Table 1
Wasatch Survey Estimates - 1940 and 1941

Area	Control Unit	1940 Acreage	1940 Number of Attacks	1940 Attacks per Acre	1941 Acreage	1941 Percent Cruise	1941 Number of new Attacks	1941 Number of Hold-overs	1941 Total Number of Attacks	1941 Attacks per Acre	Percent Relationship of 1941 to 1940 Attacks
North Side	Wyoming	—	—	—	8,144	2.5	640	—	640	.079	—
"	West Fork	11,904	3,040	.255	13,412	2.5	120	—	120	.009	-96.47
"	East Fork	14,042	7,442	.530	20,924	2.5	400	—	400	.019	-96.42
"	Smith's Fork	16,968	1,527	.090	27,680	2.5	720	—	720	.026	-71.11
Sub Total		42,914	12,009	.280	70,160		1,880	—	1,880	.027	-90.36
Provo-Duchesne	Norway Flats	—	—	—	260	6.6	30	—	30	.115	—
	Hades Canyon	—	—	—	1,280	2.5	1,120	200	1,320	1.031	—
"	Upper Setting	—	—	—	2,560	2.5	197	—	197	.077	—
"	Mirror Lake	4,480	1,254	.280	7,000	2.5	320	200	520	.074	-73.57
"	Iron Mine	5,800	16,704	2.880	10,610	2.5	14,272	2,868	17,140	1.615	-43.92
"	Broadhead-Haystack	10,960	2,875	.262	14,200	3.0	2,040	670	2,710	.191	-27.10
Sub Total		21,240	20,833	.981	35,910		17,979	3,938	21,917	.610	-37.82
Rock Creek	Miners Gulch	—	—	—	300	2.0	100	—	100	.333	—
"	Corral Creek	500	685	1.370	520	5.0	160	140	300	.577	-57.88
"	Peterson Gulch	—	—	—	1,120	2.5	80	—	80	.071	—
"	Squaw Basin	2,880	547	.190	2,880	2.5	600	80	680	.236	+24.21
"	Fish Creek	3,440	2,408	.700	3,552	2.5	3,760	80	3,840	1.081	+54.43
"	Rock Creek	5,850	9,184	1.570	8,064	2.5	9,640	2,080	11,720	1.453	- 7.45
"	Grandaddy Lakes	—	—	—	8,820	2.5	200	—	200	.023	—
Sub Total		12,670	12,824	1.012	25,256		14,540	2,380	16,920	.670	-33.80
Total		76,824	45,666	.594	131,326		34,399	6,318	40,717	.310	-47.81

INSTRUCTIONS TO SPOTTERS

Wasatch National Forest - 1941

By
R. L. Furniss
Assoc. Entomologist

Spotting of mountain pine beetle infested trees on the Wasatch during the 1941-42 season promises to be unusually difficult. This is assuming that conditions, found from September 15 to 18 on the area adjacent to the Soapstone utilization road, are typical of conditions on other treating areas. The difficulty arises from the occurrence of a high percentage of hold-over brood in trees attacked during 1940.

Presumably the unusually short, wet, growing season of 1941 retarded brood development. During the spotter instruction period it was found that approximately one hold-over tree occurred to every two newly attacked trees. Brood in these hold-over trees varied in development from large larvae to new adults with the latter predominating. Practically all the 1941 trees had been only recently attacked, as evidenced by the fact that only an occasional tree contained any larvae, all very small. Attacks with only eggs present predominated, but there were numerous trees in which the beetles had barely penetrated to the phloem.

Inasmuch as it is problematical how much additional emergence from the hold-over tree will occur, special rules of marking to fit the season seem called for. These rules were developed during the spotters training period and probably will need to be revised as the season advances, particularly if a large percentage of the hold-over brood emergence occurs before winter. Special consideration needs to be given both the old and the new trees.

Hold-over Trees:

It was found through a reexamination of numerous trees that were marked during the fall of 1940 that many of them still contained broods. Those with such broods are very largely the ones with greenish foliage, i.e., fading. Those with red foliage can be largely disregarded. Enough trees were felled to indicate that those containing a considerable amount of brood at head height should be treated. When it is necessary to remove much bark to find a beetle, the tree does not require treatment. Marking for treatment should be on the basis of conditions found on the day of examination. The hold-over trees should be sufficiently designated in the records, if not by a separate series of numbers then by a suitable prefix such as "H", so that they can be readily identified both in the field and in the office. Until all possibility of flight ends, a constant check should be made by the camp foreman to determine whether the hold-over trees still contain brood. (Flight should end when temperatures at midday fall consistently below 60 to 70 degrees F.) By this means it can be determined whether treating the hold-overs should be continued during the winter.

1941 Trees:

Lateness of attack has resulted in the occurrence of many trees which can not readily be identified as "bug trees". There are chiefly the recent "one sided attacks" in which the beetles are not well established. Here again the emphasis must be placed upon conditions found at the time of examination. In general, those trees attacked only basally on one side and with heavy pitch tubes forming can be considered as "pitch outs" and left unmarked. Those trees attacked above head height, even though only on one side, and which show the small relatively dry pitch tubes characteristic of successful attack, should be marked. All trees showing the sawdust ring at the base should be marked. It is well to remember that it is safer to mark too many rather than too few trees. As treating progresses the spotters should observe some of the doubtful trees during treatment in order to check upon the marking practice.

Spotting Method:

No change in the general method of spotting used during the 1940-41 season is necessary. Briefly, this method consists of a six-man crew comprised of a compassman-mapper and five spotters covering a five-chain strip starting at a previously established base line. The compassman marks his course with colored cloth and establishes marked stations at ten-chain intervals. In addition he maps all bug trees. Each compass line is traversed twice, first with the spotters on one side in wing formation and then on the other. Each spotter covers a one-chain strip and the outside man marks the outside of his strip with paper to make certain that the area is completely covered. The general mechanics of this method seem well understood, but there are a few points that should be stressed to increase proficiency.

At intervals of not more than five chains the compassman should call "line" and each spotter should reply in turn from the inside to the outside. Immediate and audible reply will help to keep the crew in line and thus assure full coverage of the area. The center man (No. 3) should assume the responsibility of keeping the strip of the proper width. (A good spotting crew will make so much noise that the members should not see many deer during working hours.)

This year, more than ever before, it should be stressed that each spotter should examine each pine on his strip.

The outside man has a difficult job in making his line and at the same time covering his strip. He should be helped by the No. 4 man.

If for any reason one of the crew members stops, he should call out "Hold the line". The other crew members should not advance, other than to even up the line, until the "Line ahead" signal has been given.

Upon encountering a bug tree a spotter should halt the crew and proceed with the examination as rapidly and accurately as possible. He should then blaze the trees (singles and doubles on three or four sides, and three or more on one or two sides). In case there are three or more trees the adjoining spotters should help. When the trees are all blazed the spotter calls to the compassman for a number by shouting "Bugs" for a 1941 tree and "Hold-over" for a 1940 tree containing brood. Upon receiving the number, the spotter indicates the size of the group by repeating "Bugs 51-59", for example. The trees should be rapidly marked and the "line ahead" signal given as soon as possible. In marking the trees, it should be kept in mind that the numbers must be read by the treating crew. A clean blaze and legible figures will help greatly.

Each spotter should be designated, preferably by numbers from one to five to aid the mapper in locating the trees. If letters are used care should be used to choose those that do not sound alike when called out at a distance. The compassman would map "Hold-over 10 - 15, No. 5 on the outside" as a group of six 1940 trees located near the outer edge of strip 5.

The chief spotter has the responsibility of seeing that each man in his crew is properly performing his duties. In addition he has the duty of seeing that the spotting map is kept up to date and is available to the camp foreman.

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CONTROL - Wasatch
Insect

October 14, 1941.

Mr. F. P. Keen,
Senior Entomologist,
Forest Insect Laboratory
Portland, Oregon.

Dear Mr. Keen:

We are enclosing for your and Mr. Furniss' information a copy of the findings of the Wasatch insect control survey crews.

We feel that the work on the north side of the Uintas comprising the West Fork, Smiths Fork and East Fork units has been successful. The work done on the south side on the Broadhead-Haystack unit has not. The Mirror Lake we believe has been.

We do not know that you would agree but we feel that the situation on the Broadhead-Haystack unit is to be expected in view of the fact that it lies immediately adjacent to the bad infestation on the Iron Mine unit.

We feel that our general plan of action should be: (1) To hold what we have and then (2) clean up additional units. Under such plan then our highest priority work would be to clean up the north side units on the Wasatch. Next on the list should be to clean up the north side of the Ashley and third would be to clean up and hold the worked-over south side units. Finally, we should attack new units on the south side.

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COPY SENT SUPERVISOR + Mr. Furniss

We will rework the Broadhead-Haystack unit and further reduce the Mirror Lake infestation and finally we hope to clean up the Iron Mine infestation.

Further than this funds will probably not be available.

Mr. Furniss is intimately acquainted with this situation and we would appreciate having his and your comments.

Very sincerely yours,

C. M. WOODS, Regional Forester,

C. J. OLSEN

By Acting.

Enclosure.